



# **CIMIS**

California  
Irrigation  
Management  
Information  
System

## **Agriculture Resource Book**

May 2000

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# Foreword

Water agencies, resource conservation districts, and others often need to develop water management plans that incorporate efficient water management practices. Among such practices are preparing a water balance for the district or region, disseminating reference evapotranspiration data to growers and other water users, and making irrigation water management information available to growers.

This *Agricultural Resource Book* is one of two books that provide information on the California Irrigation Management Information System and other water management programs. The other is the *Urban Resources Book*.

This *Book* provides examples of how public and private agencies use CIMIS, which can be used to help prepare water management plans or on-farm irrigation scheduling programs. Information in this publication includes: CIMIS weather station sites, Department of Water Resources CIMIS personnel, public agency contacts, consultants, irrigation software, and publications that can be used in conjunction with CIMIS.

For further information on the CIMIS Program, contact Baryohay Davidoff, Chief, California Irrigation Management Unit, DWR, Division of Planning and Local Assistance, 1020 Ninth Street, Sacramento, California 95814; (916) 327-1788. For general information on CIMIS and other publications, please call (916) 653-1097.

William J. Bennett, Chief  
Division of Planning and Local Assistance



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# Introduction

The California Irrigation Management Information System (CIMIS) has been operating successfully since 1982. This *Agricultural Resource Book* provides comprehensive information for the whole program and puts all resources regarding the agricultural uses of CIMIS into one publication.

The book is intended for anyone or any agency that needs to develop a water management program for a local agency or disseminate irrigation management information; a water supplier who provides help and assistance to its customers; and private consultants who provide irrigation scheduling and management services to growers.

## About This Book

Developing an irrigation plan can be daunting, especially if you are new to CIMIS or to the concept of irrigation scheduling. What is available in this book:

**Steps to establishing a CIMIS-based irrigation program:** Three basic steps are provided to help you start a successful CIMIS-based irrigation management program.

**Examples of how others are using CIMIS:** These examples will provide some insight into how CIMIS can be used and allow you to choose or modify one or a combination of existing programs to suit your resources. The names, addresses, and telephone numbers of people to contact are provided at the end of each example.

**Basic CIMIS information:** CIMIS weather station sites and addresses and telephone numbers of appropriate Department of Water Resources personnel are included in this section. You will be able to locate the nearest appropriate weather station and contact person to help you with any CIMIS-related questions. Also included in this section are the CIMIS data dissemination points such as radio stations, telephone recordings, web sites, and newspapers.

**Public Agency Contact:** A list of State and local government contacts such as county cooperative extension office addresses and telephone numbers are included here.

**General information:** Lists of irrigation scheduling software, irrigation consultants, irrigation mobile laboratories, and irrigation training are included in this section.

**Publications:** Many publications that can be used in conjunction with CIMIS are listed. These include University of California Cooperative Extension, local agency, and DWR publications.

The resources and examples provided here will help you to choose what action may be appropriate to your particular situation. At any step of your work, staff from the Department of Water Resources are available to help you. You may reach CIMIS staff at the phone numbers listed on pages 41-42.

## What is CIMIS?

CIMIS, the California Irrigation Management Information System, is an integrated network of more than 100 computerized weather stations located at many agricultural and urban sites throughout California. The names of current and historical CIMIS weather stations and a map showing the location of current weather stations are in the “Basic CIMIS Information” section. CIMIS, which is operated by the California Department of Water Resources, helps agricultural growers and park, golf course, and other landscape managers develop water budgets to determine when to irrigate and how much water to apply. The primary use of the CIMIS system is to provide information for improving water and energy management through efficient irrigation practices.

Weather data are collected from each weather station in the network and transferred to a centralized computer in Sacramento. After being analyzed for accuracy, the data are used to estimate soil evaporation and the amount of water used by the irrigated grass (transpiration) around the weather station. The combined value of estimated grass water use and soil evaporation is referred to as “reference evapotranspiration” or ETo. The ETo data is then stored in the form that is available when the computer is called.

Changes in ETo can be used as a guide to changes in crop or landscape water use over time. By using crop coefficients (Kc) and ETo, actual water use can be estimated with a fair level of accuracy. These Kc values have been developed for many trees, vines, agronomic crops, grasses, vegetables, and landscapes. They are available in UC Cooperative Extension publications that can be obtained from DWR (see “Publications” section of this *Agricultural Resource Book*).

## Weather Station Siting Criteria

Many local agencies want to buy, install, and connect weather stations to the CIMIS network. A weather station site can affect the accuracy of ETo. With the help of the University of California, DWR prepared criteria to help these agencies find and judge prospective sites for CIMIS weather stations.

Buildings or trees close to a weather station can affect wind speed data, which in turn affects the estimated ETo. The absence of healthy green grass around a weather station affects humidity, which will adversely affect ETo. Bare soil instead of cropped grass around the station can increase advective energy, resulting in increased temperatures and decreased humidity, which in turn increase the ETo value.

A CIMIS weather station's location should represent the largest possible surrounding area. The grass at the site should be well maintained, properly irrigated and fertilized, and mowed or grazed frequently to maintain a height between 10 to 15 centimeters (4 to 6 inches).

## **Regional and Local Criteria**

Site the station within the region it is meant to represent.

Locate the station in an area with a distinct climate, not in a transitional area between two regions of distinct climates, unless you are attempting to characterize that transitional area.

Site the station away from topographic depressions, as the temperature there is frequently higher during the day and lower at night. High points should also be avoided in most cases.

Make a long-term commitment to maintain the same land use in and around the site, to avoid moving the station in the future.

## **Surrounding Environmental Criteria**

Site the station away from wind obstructions within 90 meters (100 yards) of the site. Choose a site that has no linear obstructions, such as buildings or windbreaks, within 137 meters (150 yards) perpendicular to the direction of the prevailing wind.

Place the station at a distance from fields where there are frequent crop rotations, because the fields will have bare soil between crops.

Site the station away from abrupt crop/vegetation changes (i.e., pasture to row crops) within 45 meters (50 yards) of the site, or 90 meters (100 yards) upwind of the site.

## **CIMIS Cooperators**

Although CIMIS is managed by the California Department of Water Resources, most of the stations are owned or maintained by the following local organizations.

Alameda County Water District  
Apple Valley Resource Conservation District  
Arvin-Edison Water Storage District  
Blythe Resource Conservation District  
California State University  
Calleway Vineyards  
City of Petaluma  
City of San Diego  
City of Santa Cruz  
City of Santa Rosa  
Coachella Valley Resources Conservation District  
Coachella Valley Water District  
Contra Costa Resource Conservation District  
Cuyama Valley Resource Conservation District  
Driscolls Strawberries  
East Bay Municipal Utility District  
Goleta Water District  
Hi-Lo-Golf  
Imperial Irrigation District  
Madera Irrigation District  
Marin Municipal Water District  
Merced Irrigation District  
Metropolitan Water District of Southern California

Mojave Desert Resource Conservation District  
Monterey County Water Resources Agency  
Napa County Resource Conservation District  
North Marin Water District  
Orange Cove Irrigation District  
Otay Water District  
Palo Verde Irrigation District  
Panoche Water District  
Paramount Farming  
Plantscience, Inc.  
Richard Rodoni  
Sacramento Area Water Works Association  
San Benito County Water District  
San Diego Gas & Electric  
Santa Clara Valley Water District  
Shenandoah Valley Grape Growers Association  
Solano County Water Agency  
United States Bureau of Reclamation  
United States Department of Agriculture  
United Water Conservation District  
University of California  
Valley of the Moon Water District  
Windsor Water District

## How to Get CIMIS Information

You can access the CIMIS computer through a dial-up service or the Internet. The dial-up service is available by a toll-free telephone call. However, a USER ID and password are required. On the Internet, CIMIS data is available via Telnet, FTP, and the World Wide Web.

Most network packages and operating systems have a Telnet program; a valid USER ID and password are required. The CIMIS Telnet host name is **aviion.water.ca.gov**. You can access daily data for the past seven days and monthly data for the last twelve months through FTP. Text files containing data, grouped by county, are deposited daily on the CIMIS FTP site. A USER ID and password are not required; you can log on to the CIMIS FTP site with an anonymous username and your e-mail for a password. On the World Wide Web, CIMIS information and data are available at:

CIMIS: **[www.dpla.water.ca.gov/cimis.html](http://www.dpla.water.ca.gov/cimis.html)**

Statewide IPM Project, University of California: **[www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu)**

Wateright: **[www.wateright.org](http://www.wateright.org)**

Fruits and Nuts Center, University of California, Davis:

**[www.fruitsandnuts.ucdavis.edu/weather/theservice.html](http://www.fruitsandnuts.ucdavis.edu/weather/theservice.html)**

CIMIS information is also available statewide from local water agencies, farm advisors, newspapers, radio stations, and industry publications. Several consultants also use CIMIS data to provide services to growers, golf courses, and parks.

Further information or assistance on CIMIS can be obtained from DWR CIMIS staff. A list of CIMIS personnel is given in the "Further Information Sources" section starting on page 29.

# Establishing a CIMIS Irrigation Management Program

Three basic steps for establishing such a program are outlined below. The resources and information required are available in this *Agricultural Resource Book*.

## Step One : Designate a Staff Person

The first step is to designate a staff person who will be responsible for the program. The person will be a liaison between your agency and other agencies such as DWR, Cooperative Extension, and the media. If the person needs training in basic irrigation concepts, training classes and seminars are offered by various institutions (refer to the "Training Information" section). Information on CIMIS workshops can also be obtained from DWR CIMIS staff shown in the "Public Agency Assistance" section.

## Step Two : Retrieve CIMIS Data and Disseminate

Retrieve ET data from any of the Web sites listed in the "How to Get Info" section and disseminate. You can also link to the CIMIS Web site from your agency Web site.

At this point, it is probably a good idea to alert irrigation water users in your area that you will be disseminating ET data. Local news media, leaflets, and your own agency newsletter, Web pages, or water bills are some of the ways to publicize availability of data. As an example, a rolodex card from Mission Resource Conservation District (Figure 1) advertising availability of ET data is shown below.

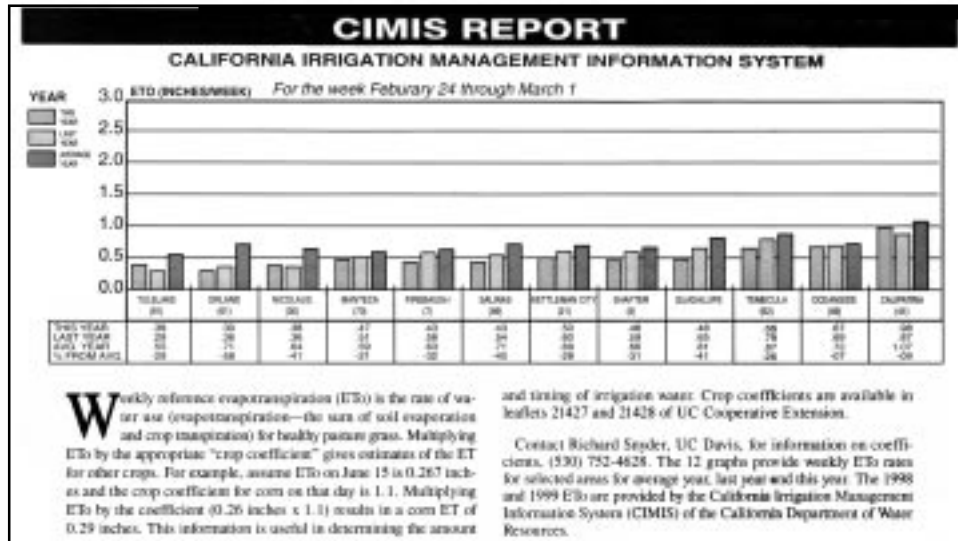
Figure 1



The internet, newspapers, newsletters, radio, television, and telephone recording systems can help you disseminate the information. This publication's sections on "Examples" and "Basic CIMIS Information" contain examples of data dissemination sources. Two actual CIMIS data dissemination examples are given on pages 6 and 7. Figure 2 is extracted from the California Farm Bureau Federation's *Ag Alert* newspaper. Figure 3 is a copy of a fax

sheet distributed by Imperial Irrigation District. Since CIMIS disseminates reference ET data only, the local farm advisor can help convert the data to a specific crop water use number.

Figure 2

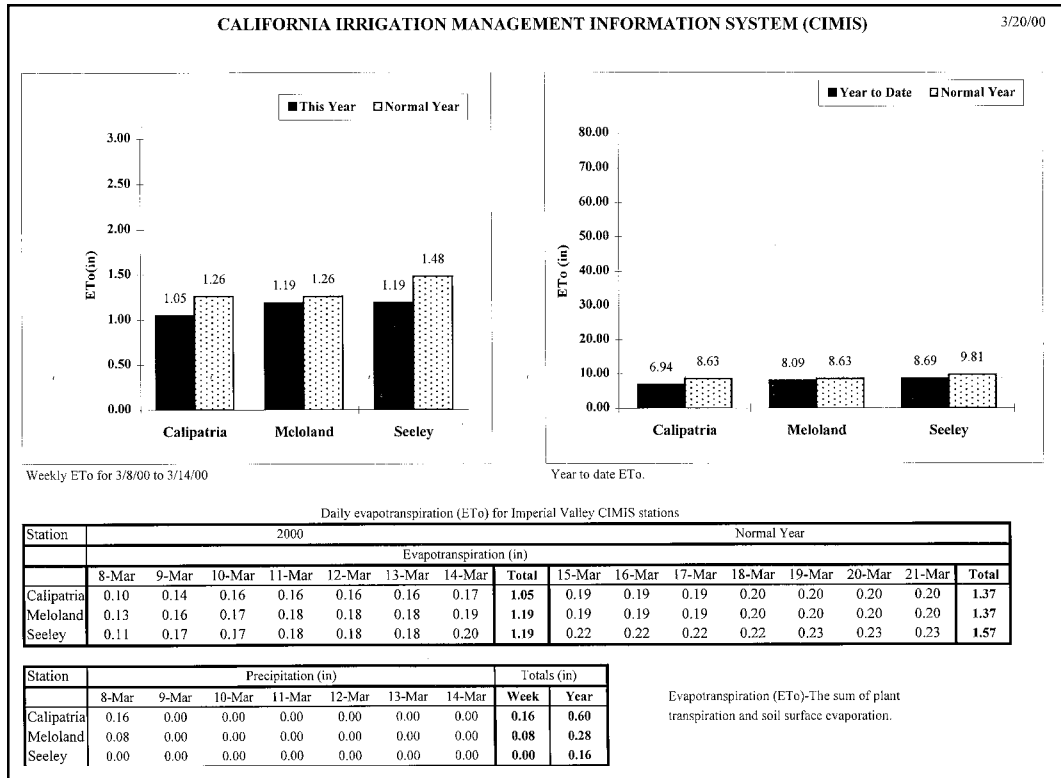


## Step Three: Implement and Promote the Program

The final step is the public assistance and implementation step. While some people may know how to use CIMIS ET data for scheduling irrigations, others may need assistance. Appropriate agencies to work with include the local farm advisor, the USDA - Natural Resources Conservation Service, and irrigation consultants for assistance on appropriate crop coefficients and on the use of the ET data. It may be helpful to organize workshops or training sessions for your water users.

These steps are not the only ways to implement a program. You may also read through the "Examples" section and see what has been tried by other agencies. If any look appropriate to your particular situation, call the person listed at the bottom of the page under "For Further Information" to obtain more specifics. While considering the resources available to you, adapt your selected methodologies described in the "Examples" section to develop feasible plans with assurance that the general principles have worked in the past and will probably work for you.

Figure 3







# Examples

The following examples describe successes of agencies and communities using CIMIS. Their situations may suggest an alternate way of approaching a common agricultural problem.

## Avocado Commission CIMIS Water Requirement Calculator

The California Avocado Commission has designed a CIMIS Water Requirement Calculator on their Web page ([www.avoinfo.com/growers/cimiscalculator.shtml](http://www.avoinfo.com/growers/cimiscalculator.shtml)), which allows avocado growers to calculate the amount of water needed by an avocado tree each day. To use this calculator (Figure 4), you must know a few facts about your crops, including the distribution uniformity (DU) of the irrigation system, trees per acre, tree spacing, sprinkler output, and the leaching requirement. If you don't know the distribution uniformity, use 85 percent (.85). The CIMIS Data Calculating Instructions on the Web page provide a formula to calculate the leaching requirement (LR), but you can also use a fixed LR such as 10 percent. If you are uncertain what to enter, click on a link next to the box to get a definition of the item needed. Once you enter this data, with an ETo reading from CIMIS and a Kc for the chosen month, press "Calculate" to receive an estimate of water needed per tree per period of time and the watering time for each tree.

Figure 4: CIMIS Water Requirements Calculator

The screenshot shows the 'CIMIS Water Requirements Calculator' web form. At the top, it says 'The California Avocado Commission' and has a 'Main Page' link. The form contains several input fields with labels and values:

- Cumulative ETo (ETc):** .22. To the right is a link: 'Go To CIMIS - Retrieve daily, weekly or monthly ETc'.
- Crop Coefficient (Kc):** [empty]. To the right is a link: 'Get Kc for current month: Jan'.
- Distribution Uniformity (DU):** .85.
- Trees per Acre:** 100. To the right is an 'Enter' button and 'Tree Spacing: 20' by 20' ft'.
- Sprinkler Output (Gal/Hour):** 17. To the right is a link: 'Leaching Requirement (LR): .10'.

Below these fields is a 'Calculate!' button. To the right of the button are two output fields: 'Water per tree per day or period: [empty] gallons' and 'Watering time per tree per day or period: [empty] hours, [empty] minutes'.

At the bottom, there is a link: 'Return to the California Avocado Commission Growers Page', and a footer: 'CIMIS Calculator by: Arden Altsch, Shari Altsch, and Ben Faber. Copyright ©1999 California Avocado Commission'.

For further information on the Web page, contact Michelle P. Spelman, Communications Manager, California Avocado Commission, [mspelman@avocado.org](mailto:mspelman@avocado.org).

## **Scheduling Wine Grape Irrigation Using CIMIS**

A 3-year study conducted by the Cachuma Resources Conservation District observed the effects of water-budget irrigation scheduling using CIMIS and published crop coefficients. The objectives of the study were to: (1) demonstrate ET-based irrigation scheduling using CIMIS data and locally-developed crop coefficients and (2) show the influence of a water deficit on the yield and quality of drip-irrigated wine grapes grown on California's central coast.

The study consisted of three replicated irrigation treatments, which included:

- non-stressed irrigation water applied at a rate to replace crop ET;
- water applied at a rate to replace 50 percent crop ET at veraison; and
- water applied at a rate to replace 50 percent of crop ET at fruit set.

This experiment showed a significant reduction in pruning weights for treatments two and three, and a slight reduction in the weight of sound fruit harvests. No differences were observed in total yield, berry weight, soluble solids, or pH. Plant water stress was not significantly different between the treatments, due to the timing of irrigation rather than the quantity of water applied. Very little water stress was observed in the treatment plot receiving 50 percent of the fully-water treatment, even considering the reduced canopy and soil moisture release factors used to determine water requirements.

This study demonstrates that the water budget method of irrigation scheduling, i.e., using published crop coefficients and CIMIS ETo, is useful for scheduling wine grape irrigation on California's central coast. However, recommended crop coefficients in the literature appear to overestimate crop water needs, so local crop coefficients are needed.

For further information, contact Kevin Peterson at the Cachuma Resources Conservation District, (805) 937-6363, or call CIMIS at (800) 922-4647.

## **Water Savings for Peach Growers**

A recent study conducted by Drs. David A. Goldhamer and Scott Johnson, University of California at Davis, titled “Controlled Deficit Irrigation of Early & Late Maturity Peaches,” found that growers of early season maturing peaches can reduce water use during the growing season by 30 percent and more.

Controlled deficit irrigation (controlled plant water stress), or as it’s more commonly called, regulated deficit irrigation (RDI), is a technique in which water stress is imposed on the crop at the proper time, thus reducing the amount of water applied.

The study found that data from CIMIS, along with crop coefficient data, can help farmers who grow early season maturing peaches, such as Spring Lady, practice controlled plant water stress during the growing season. The research found that deficit irrigation during part of the growing season can reduce water use while still producing a high-quality crop. RDI was not economically sound or effective for the late season Cal Red peaches.

RDI, although not a viable water-saving solution for all peach growers, is an effective way of reducing water use without much cost or effort for growers of early maturing peaches. All that is needed is CIMIS ETo, peach crop coefficient, and information on how to properly implement RDI.

For further information, contact David A. Goldhamer at Kearney Agricultural Center, 9240 South Riverbend Avenue, Parlier, California 93648; (559) 646-6500.

## **CIMIS at the Farm Level: A Walnut Grower's Experience in Walnuts**

To help introduce the statewide CIMIS program, University of California Cooperative Extension and Kerney Agricultural Center scientists conducted an on-farm demonstration from 1983 to 1988 in a Kings County commercial walnut orchard. Objectives of the demonstration were to: (1) document the original irrigation practices in the orchard, (2) implement appropriate changes in the original irrigation practices based upon CIMIS information, and (3) document orchard response to modification of the original irrigation management.

A 27-acre Serr walnut orchard on paradox rootstock was selected in 1983. The orchard had been established since 1972. A border flood irrigation system with one valve per basin was used. Basin dimensions were 600 feet x 30 feet with no slope across the borders and 0.03 percent grade down the basin. Irrigation water was provided from the Kings River with supplemental water from shallow wells. Native vegetation on the no-till orchard floor was controlled by mechanical mowing. Annual rainfall ranged from 2.4 inches to 9.3 inches at the demonstration site.

Farm records of applied water and irrigation dates were reviewed for the 1982 and 1983 seasons. These records reflected water management without CIMIS information. Then a CIMIS-based water budget was implemented from 1984 through 1988.

Results from this on-farm implementation of CIMIS indicate there is opportunity to increase crop production by improving irrigation practices based upon CIMIS information. Farm profits increased an average of \$245 an acre over five years of improved irrigation which approached real-time estimates of crop water use. An average of 1.9 acre-feet of additional water was justified for each acre of land put to reasonable beneficial use.

For further information, contact UC Cooperative Extension, Kings County, 680 North Campus Drive, Hanford, California 93230; (559) 582-3211.

## **Saving Water Through Forecasting and Technology**

In 1994, responding to needs of the growers, Coachella Valley Water District began to provide office space for a one-person, half-year, weather forecasting operation. The primary purpose was to warn growers, through weather forecasting and communications, of impending frosts and freezes. National Weather Service supplied a meteorologist for six months each year through the colder months.

To assist farmers in getting timely local weather and frost forecasts, the District installed telephone equipment to provide around-the-clock recorded forecasts and installed a weather radio station which beams signals throughout the area from CVWD's headquarters.

In 1987, the Association of Golf Course Superintendents bought a weather station which was installed as part of CIMIS by the Coachella Valley Resources Conservation District and the College of the Desert.

To help publicize the new weather station and make evapotranspiration information more familiar and available to the golf industry, CVWD asked a long-time local meteorologist to add daily ETo to his forecast. As a result, the number of calls to the recorded information messages over the past six years has doubled to 8,000 calls per month.

Records of some golf courses show dramatic reduction in water use. In 1992, 16 golf courses set new individual records of reducing water use during the previous 12-month period.

For further information, contact Dave Harbison at Coachella Valley Water District, Post Office Box 1058, Coachella, California 92236; (760) 398-2651, Ext. 541.

## **Estimating Orchard Water Use With CIMIS**

*Estimating Orchard Water Use with CIMIS* is a booklet published by the Mission Resource Conservation District. The booklet outlines what one needs to know to use CIMIS as an effective and simple irrigation scheduling tool. Included is information on the use of potential crop rooting depth; soil water-holding capacity; available water; size of area wetted by irrigation system; flow rate of emitters; irrigation system emission uniformity; and management allowable depletion to determine the irrigation run times to fill the soil reservoir.

By following the steps outlined in this booklet, you will be able to determine basic characteristics about your crop, soil, and irrigation system. With this information in hand, you can begin scheduling irrigations with CIMIS.

For further information, contact Judy Mitchell at Mission Resource Conservation District, 1181 East Mission Road, Fallbrook, California 92028; (760) 728-1332.

## **Conservation Program Earns Water Rights From State**

Some 2,000 acre-feet of water a year have been documented as saved by El Dorado Irrigation District's Irrigation Management Services program, although these savings may be somewhat understated. It was this program that helped the county secure water rights for the now defunct South Fork American River Project. The EDI's Irrigation Management Services program will also help secure water rights for future water projects.

The program uses meteorological data to produce a spread sheet for farmers that indicates exactly the depth of water to apply, for how long, and on what date. Soil and crop information is combined with data from CIMIS to obtain a precise printout directing growers when to irrigate.

Growers not only save money through EID's conservation program, which is free to them, but they also improve their crops. Too much water promotes diseases and reduces the quality of the fruit. The only requirement for becoming part of this program is that at least 5 acres of the person's property be planted.

Due to a large diversity in the density of the planting on each field, program staff cannot document how many gallons of water can be saved per acre. The average field is 125 trees per acre, but with the new technology in high-density planting, some fields have upward of 1,000 trees per acre. For this reason, the high-density field on the water conservation program may seem to use a large amount of water, when in fact it uses water more efficiently because of the higher yield it produces.

For further information, contact Dorine Kelly or Jim Kosta at El Dorado Irrigation District, 2890 Mosquito Road, Placerville, California 95667; (530) 622-4513.



## **Low Volume System Irrigation Scheduling With CIMIS**

Scheduling irrigation at the University of California Nickels Soils Laboratory has improved greatly since establishment of CIMIS. Eighty acres of the 200-acre orchard is planted to almonds, walnuts, and prunes. Irrigation water is supplied by low-volume drip, subsurface drip, and microsprinkler irrigation systems. Prior to the availability of CIMIS, historical data from evaporation pans and other estimates were used to determine irrigation schedules. This often led to over or under application of water resulting in poor water use efficiency. Currently, the lab manager uses a computer modem to access CIMIS on a weekly or daily basis and then simply adjusts water application schedules to replenish soil moisture. (Actually, data from two nearby CIMIS stations are evaluated to check reliability.) This "debit/credit" method avoids costly over or under irrigation and results in fewer irrigation headaches.

A simple formula is then used to calculate hours to operate the system, taking into consideration  $ETo$ , tree density, application rate, crop coefficients, and system efficiency. The manager then sets the automated system timers that in turn operate valves for the duration of the daily irrigation set. Peak electrical use periods are avoided if possible. Orchard blocks with different tree spacing, tree age or system parameters, of course, require separate calculation and individual timers, valves, etc.

Effective use of CIMIS-based irrigation management also requires thorough consideration of other factors including tree response, weather extremes, and soil variations to successfully irrigate the orchard. CIMIS serves as the primary guide to use water efficiently and profitably; however, regular observation is equally essential. Often adjustments in operation time, emitters, and flow regulators are necessary to compensate for the other factors.

Finally, the irrigation system should be maintained regularly. Routine flushing of filters, submains, and hoses is imperative to take full advantage of the efficiency enhancements that CIMIS data provide. Emitter replacement and occasional chemical injection may also be necessary. Considering these factors, employing a CIMIS irrigation strategy has accelerated orchard development and led to a new level of crop production at the California Nickels Soils Laboratory.

For more information, contact John P. Edstrom at UC Cooperative Extension, Colusa County, Post Office Box 180, Colusa, California 95932; (530) 458-0577.

## **Run Time and ETo by Phone**

In 1993, with the cooperation of public agencies, the UC Cooperative Extension, Fresno and the Kings River Conservation District developed AgLine, a 24-hour agricultural news and information system that can be accessed by phone. It contains information on crop water use and cultural and pest management information for almonds, deciduous trees, and citrus. AgLine information is updated every week. It is a free telephone call within the Fresno area at (209) 488-1940.

While availability of ETo data alone is sufficient for most farmers, there are some who may require assistance in weather-based (ETo) irrigation scheduling. AgLine bridges the gap between CIMIS ETo data and irrigation scheduling. The crop water use section of AgLine not only provides callers with reference evapotranspiration, but also information on specific crop evapotranspiration (ETc). Water uses in inches for trees and vines, and field and row crops are provided. In addition, water use in gallons per day and the run time for low-volume irrigation systems are provided. AgLine gives callers instructions on how to calculate run times based on type of tree, tree spacing, and irrigation system efficiency.

By providing application rates, AgLine has made it easier for farmers to use CIMIS data. Moreover, farmers are directed to irrigation specialists at the Kings River Conservation District for any further assistance. Many farmers have benefited from this model program.

For more information, contact Scott Feistel or Steve Haugen at Kings River Conservation District, 4886 East Jensen Avenue, Fresno, California 93725; (559) 237-5567.

## **CIMIS Dollars and Cents**

The use of CIMIS has grown steadily since inception of the program in 1982. To date there are over 3,200 registered users, and the number of direct calls to the CIMIS computer stands at about 23,000 a year, in addition to the 25,000-a-year requests for data from the CIMIS Web site. The increase in both number of registered users and calls to the computer indicates that benefits are being derived from the program by those who use it.

The three main benefits that users mention are irrigation timing, yield improvements, and water application optimization. A summary of these benefits is given below. It is compiled from surveys of CIMIS users.

In a survey conducted by the student chapter of the National Agri-Marketing Association at the University of California, Davis, 68 percent of growers and 60 percent of irrigation consultants felt that CIMIS helped in optimization of water application. These figures are supported by another survey done by the Department of Agricultural and Resource Economics at the University of California, Berkeley, in which some growers reported applied water reductions of between 10 percent and 20 percent.

NAMA also found that 23 percent of growers saw an increase in crop yield, and 28 percent saw an increase in crop quality when scheduling with CIMIS. Again, according to the UC Berkeley survey, pistachio, walnut, and almond yields increased about 20 percent. Other estimates indicate a \$60 to \$175 per acre gain as a result of scheduling cotton irrigations using CIMIS.

Undoubtedly, stretching water supplies and increasing and/or improving the quality of yield will translate into more money in the grower's pocket. In other words, CIMIS makes sense if it results in more dollars.

For further information, contact Simon Eching at Department of Water Resources, Division of Local Assistance, 1020 Ninth Street, Sacramento, California 95814, (916) 327-1836; and Nancy Tibbitts, University of California, Davis, Internship and Career Center, Davis, California 95616, (916) 752-2868.

## **Irrigation Scheduling on the Web**

You can now develop an irrigation schedule guide for turf and agricultural crops through the World Wide Web, using a new program called Wateright, which is located at [www.wateright.org](http://www.wateright.org).

The program was developed by the Center for Irrigation Technology, with significant support from the U.S. Bureau of Reclamation. Wateright is linked to CIMIS ETo data for specific sites in California. The program references the CIMIS weather stations to develop site-specific irrigation scheduling guidelines for California.

Wateright is an educational tutorial about weather-based irrigation scheduling that also provides irrigation schedule guidelines for local sites. The tutorial uses animation and text to educate the user on weather-based irrigation scheduling principles and practices, serving homeowners, turf/landscape professionals, and farmers.

You can develop an irrigation-scheduling guide by answering a few field-specific questions. If you don't know the specifics for an irrigation system, you can print out a questionnaire to help you. The questions cover your irrigation system and equipment, soil type, crop selection, planting date (annuals), etc. Fill out the questionnaire before you create the scheduling guide. Wateright provides some default values for management-allowed depletion (MAD), distribution uniformity (DU), or scheduling coefficient (SC) as starting points to develop your own irrigation-scheduling guidelines.

The next step is to select a nearby CIMIS station, which is the reference for establishing your irrigation schedule guide. Select the appropriate county and choose the nearest or most representative CIMIS station within that county. Since weather conditions create plant water demand, select a reference which is similar to your site.

Five-year historical data is used to develop an irrigation guide. Wateright compares the historically-based irrigation guideline with current weather data and notes any run times that are significantly different than current weather conditions predict. Use the scheduling guide to compare it to current practices so you can explore any major differences between the two.

Wateright walks you step-by-step through the process. The program was designed so anyone, even someone with little or no irrigation experience, can learn about weather-based irrigation scheduling and develop an irrigation-scheduling guide on the first visit to Wateright.

As with all weather-based irrigation-scheduling guides, actual irrigation requirements should be verified by observing plant material and verifying soil moisture levels. Wateright provides a site-specific adjustment of the initial run-time estimates for each field you entered. The

original estimates are set at 100 percent. You can customize each field or area between 50 to 150 percent by using a dropdown box. Adjust the field each time guidelines are generated to reflect the water requirements of your crops.

A comment section is available, and Waterright welcomes your comments.

For further information, contact David Zoldoske, Center for Irrigation Technology, California State University Fresno, 5370 North Chestnut Avenue, Fresno, California 93740-0018; (559) 278-2066.

## Telephone Access to CIMIS Information

The Mission Resource Conservation District first became involved in the field of irrigation water management in 1983 when it started using one of the first DWR-sponsored Mobile Irrigation Laboratories. The program was joined in 1990 by a Large Landscape Turf Water Management Program and an Agricultural Water Management Program.

As a further supplement to the District's irrigation water management outreach in San Diego County, MRCD set up an "800" CIMIS information line in 1990. This toll-free line provides access to ETo data from five local CIMIS stations. This includes four coastal area stations (#49 at Oceanside, #66 at San Diego, #147 at Otay Lake, and #150 at Miramar) and two inland area stations (#62 at Temecula and #153 at Escondido SPV).

Mission's 800 line can easily be duplicated by other agencies with an interest in disseminating CIMIS information. Many phone companies and local businesses offer voice mail box services at reasonable prices. If one or two stations are being reported, a single mail box will do. If a large number of stations are reported, or if you wish to supplement ETo data by giving weekly averages, for example, multiple mail boxes will allow you to select the particular station you need without having to listen to information from stations you don't want. Other mail boxes on the line can be used to explain how to use CIMIS information, announce upcoming events, etc.

Mission's system is currently set up using four voice mail boxes. Box number one contains a greeting and directions on how to access the other mail boxes. Box number two reports ETo data for the four coastal climate stations. Box number three reports ETo data for the two inland climate stations. Box number four is an auxiliary box. In the past, MRCD has used this mail box to conduct a survey on who was using the 800 line and to announce upcoming irrigation related meetings and events. Currently, box number four contains a brief explanation of the CIMIS system.

Response to the 800 line has been good. Call totals range from roughly 50 per month during the winter to over 300 per month during the summer. Phone bills from the 800 number are reported in totals for daytime rates, evening rates, and night rates. Thus, MRCD is not sure who is using the service or exactly how often they are calling. However, when occasional problems with the mail service or our 800 carrier are encountered, the office is flooded with requests for CIMIS information. Although this may be a bit of an inconvenience, it is gratifying to know that growers and landscapers depend on the service.

For further information, contact Judy Mitchell, Mission Resource Conservation District, 1181 East Mission Road, Fallbrook, California, 92028; (619) 728-1332.



# Basic CIMIS Information

The following sections contain current and historical CIMIS weather station sites and station locations (pages 32 and 33), lists of agencies, local access points, and regional access points for obtaining CIMIS information.

## Local Access Points for CIMIS ETo Information

The Department of Water Resources is encouraging local dissemination of CIMIS ETo information. Below is a list of radio stations, newspapers, local agencies, and universities that are currently providing CIMIS ETo information. If you are aware of any changes to these sources, please contact Simon Eching at 1-800-922-4647.

### Alameda County

Station 100  
Argus Newspaper  
Main Switchboard  
(510) 661-2600  
Weekly ET on Saturday

Station 100  
Alameda County Water District, Fremont  
(510) 659-1970, Ext. 220

Station 65  
East Bay Municipal Utilities District, Oakland  
(510) 287-1903\*

### Butte County

Station 8  
Butte County Chico Enterprise Record, Chico  
(530) 891-1234  
Weekly ET for pasture/turf, alfalfa, olives, orchard-three clean tilled  
leafing dates and one for grass cover crops, beets, corn and grain.

Station 8  
Gridley Herald, Gridley  
(530) 846-3661  
Weekly ET for 11 crops.

### Contra Costa County

Station 47, Station 65  
Contra Costa Water District, Concord  
(925) 688-8136  
No recording. They will fax information to you.



## **Fresno County**

NOAA Weather Radio Station

Fresno, 162.400

CIMIS ETo information can be heard weekdays, March through October, during the agricultural weather advisory report.

Station 7

Firebaugh-Mendota Journal, Firebaugh

(559) 659-3057

Station 39

AgLine, Kings River Conservation District

(559) 237-4800\*

The information is on ETo and ETc for trees, vines, field and row crops, and other crops and is prepared by Kings River Conservation District.

## **Imperial County**

Station 41, Station 87

National Weather Service Forecasting, Imperial

(760) 352-3360\*

ETo for Imperial Valley

Station 41, Station 68, Station 87

Imperial Valley Press, El Centro

(760) 337-3400

Station 41, Station 68, Station 87

Imperial Irrigation District, Imperial

(760) 339-9082

Provides weekly ETo

## **Kern County**

NOAA Weather Radio Station, 162.550 MHz, Bakersfield

CIMIS ETo information can be heard weekdays, March through October, during the agricultural weather advisory report.

## **Kings County**

Station 2, Station 15, Station 21

Hanford Sentinel, Hanford

(559) 582-0471

## **Los Angeles County**

Station 78

KIEV 870 AM, Glendale

Garden show on weekends hosted by retired farm advisor (7 a.m. Saturdays; between 5 a.m. - 7 a.m. Sundays).

Station 82

Claremont Courier, Claremont

**Marin County**

Station 63

Marin Municipal Water District, Corte Madera  
(415) 945-1579\*

Station 63

**Station 44**

Western Municipal Water District, Riverside  
(909) 780-2809\*

**Sacramento County**

Station 13  
KSTE 650 AM, Sacramento  
(916) 576-1578  
ET is presented during the Sunday morning garden show.

Station 13  
KRAK 1140 AM, Sacramento  
Information is presented on agricultural weather with ETo for Sacramento and San Joaquin Valley (7 p.m. Monday through Friday).

NOAA Weather Radio Station, 162.550 MHz, Sacramento  
CIMIS ETo information can be heard weekdays, March through October, during the agricultural weather advisory report.

Station 131  
Citrus Heights Water District/Fair Oaks Water District/San Juan Water District/  
Orangevale Water Company, Citrus Heights  
(916) 725-1713\*

**San Benito County**

Station 126, Station 143  
San Benito County Water District, Hollister  
(831) 637-8218\*  
Jeff Ray provides weekly ETo

**San Bernardino County**

Station 117, Station 134  
Mojave Desert Resource Conservation District, Hollister  
  
(760) 261-3346\* Victorville  
(760) 261-3326\* Barstow

**San Diego County**

Station 153  
Fallbrook/Bonsall North County Times, Fallbrook  
(619) 728-6116

Station 49, Station 62, Station 66, Station 147, Station 150, Station 153  
Mission Resource Conservation District, Fallbrook  
1-800-339-9954\* within area

Station 49, Station 62, Station 66, Station 153  
UC Cooperative Extension, San Diego, San Diego  
(760) 745-2215\*

**San Joaquin County**

Station 42, Station 70  
Lodi News Sentinel, Lodi  
(209) 369-2761

**Santa Barbara County**

Station 64, Station 88, Station 120  
KSNI 102 FM, Santa Maria  
(805) 925-2582  
Information aired during agricultural forecast (6 a.m., noon, and 5 p.m.)

NOAA Weather Radio Station, 162.550 MHz, Santa Maria  
CIMIS ETo information can be heard weekdays, March through October,  
during the agricultural weather advisory report.

**Santa Clara County**

Station 69, Station 132  
Santa Clara Valley Water District, Santa Clara  
(408) 267-3127\*

**Santa Cruz County**

Station 19, Station 104  
Register Pajarian, Watsonville

**Shasta County**

NOAA Weather Radio Station, 162.550 MHz, Redding  
CIMIS ETo information can be heard weekdays, March through October, during  
the agricultural weather advisory report.

**Solano County**

Station 121, Station 122, Station 123  
Solano Irrigation District/Maine Prairie Water District/Reclamation District 2068/  
Natural Resources Conservation Service, Fairfield  
(800) 897-7666\*

**Stanislaus County**

Station 71  
Modesto Irrigation District  
(209) 526-7549\*

**Tehama County**

Station 8  
Corning Daily Observer, Corning  
(530) 824-5464  
Prints weekly ET for seven crops.

Station 8  
Red Bluff Daily News, Red Bluff  
(530) 527-2151  
Prints weekly ET for seven crops.

**Tulare County**

NOAA Weather Radio Station, 162.500, Lindsay  
CIMIS ETo information can be heard weekdays, March through October,  
during the agricultural weather advisory report.

**Arizona**

NOAA Weather Radio Station, 162.550, Yuma  
CIMIS ETo information can be heard weekdays, March through October,

\* Indicates recording.

## **Agencies That Provide CIMIS Recordings**

Many water and irrigation districts access the CIMIS computer, retrieve evapotranspiration information, record, and provide a daily telephone recording of the data for access by their water users. Some of these agencies also calculate specific crop water use, record, and provide it for public access. This information can enable irrigators to manage water use more effectively for higher profits. Listed below are the names, addresses, and telephone numbers of key contacts and agencies.

### **AgLine Kings River Conservation District**

4886 East Jesen Avenue  
Fresno, California 93725  
(559) 237-5567  
Steve Haugen

### **Citrus Heights Water District/Fair Oaks Water District/ San Juan Water District/Orangevale Water Company**

6230 Sylvan Road  
Citrus Heights, California 95610  
(916) 725-6873  
Joe Scherrer

### **City of Santa Barbara**

630 Garden Street  
Post Office Box 1990  
Santa Barbara, California 93102-1990  
(805) 564-5460  
Alison Whitney

### **Coachella Valley Water District**

Post Office Box 1058  
Coachella, California 92236  
(760) 398-2651, Ext. 541  
Dave Harbison

### **Contra Costa Water District**

1331 Concord Avenue  
Post Office Box H20  
Concord, California 94524  
(925) 688-8136  
Chris Dundon

### **East Bay Municipal Utilities District**

P.O. Box 24055 MS 48  
Oakland, California 94623  
(510) 287-1823  
Dave Langridge and John Swindell

### **Eastern Municipal Water District**

2045 San Jacinto Ave.  
P.O. Box 8300  
San Jacinto, California 92581-8300  
(909) 925-7676 Ext. 4221  
Ted Haring

### **Marin Municipal Water District**

220 Nellen Avenue  
Corte Madera, California 94925  
(415) 945-1525, Ext. 365, Dave Irbarne

**Mission Resource Conservation District**

1181 East Mission Road  
Fallbrook, California 92028  
(760) 728-1221  
Judy Mitchell

**Modesto Irrigation District**

Post Office Box 4060  
Modesto, California 95352  
(209) 526-7567  
Dave Colby

**Mojave Desert Resource Conservation District**

18484 Highway 18, Suite 195  
Apple Valley, California 92307  
(760) 242-2906  
Jakie Lindgren

**North Marin Water District**

999 Rush Creek Place  
Post Office Box 146  
Novato, California 94948  
(415) 897-4133  
Edie Robbins

**Rancho California Water District**

Post Office Box 9017  
Temecula, California 92589-9017  
(909) 676-4101  
Don Peck

**San Jacinto Basin RCD**

711 W. Esplanade, Suite C  
San Jacinto, California 92582  
(909) 654-7733  
Jim Gilmore

**San Benito County Water District**

Post Office Box 899  
30 Mansfield Road  
Hollister, California 95024  
(831) 637-8218  
Jeff Ray

**Solano County**

501 Texas Street  
Fairfield, California 94533  
(707) 421-6790 Larry Clement

**U. C. Cooperative Extension, San Diego**

5555 Overland Avenue  
Building 4  
San Diego, California 92123  
(619) 694-2845 Gary Bender

**Western Municipal Water District**

450 Alessandro Boulevard  
Riverside, California 92508  
(909) 780-9764 Ext. 66  
Steven Mains

## **Regional Access Points for CIMIS Information**

### **Newspapers**

#### **Ag Alert (weekly)**

California Farm Bureau Federation  
1601 Exposition Boulevard  
Sacramento, California 95815  
(916) 924-4140  
Stations 5, 7, 21, 30, 41, 49, 61, 62, 70, 89, 91, 120  
Graphical presentation of ETo information for  
Sacramento/San Joaquin Valley agricultural areas.

### **Web Sites**

[www.avoinfo.com/growers/cimiscalculator.shtml](http://www.avoinfo.com/growers/cimiscalculator.shtml)  
[www.ipm.ucdavis.edu/WEATHER/about\\_weather.html](http://www.ipm.ucdavis.edu/WEATHER/about_weather.html)  
[www.wateright.org/site/reference/cimisdist.html](http://www.wateright.org/site/reference/cimisdist.html)  
[www.citrusresearch.com/sub/sub697/county.htm](http://www.citrusresearch.com/sub/sub697/county.htm)  
[www.fruitsandnuts.ucdavis.edu/weather/theservice.html](http://www.fruitsandnuts.ucdavis.edu/weather/theservice.html)  
[www.dpla.water.ca.gov/cimis.html](http://www.dpla.water.ca.gov/cimis.html)  
[www.dpla.water.ca.gov/urban/wc.html](http://www.dpla.water.ca.gov/urban/wc.html)

Many water agency Web sites also have CIMIS information. Check your local agency Web site.

### **CIMIS Alert**

CIMIS Alert is a program sponsored by DWR to help public and private agencies provide a useful, cost-effective service to water users.

The CIMIS Alert program helps public agencies to establish a daily telephone recording of local evapotranspiration (ETo). Contact your local water agency and/or cooperative extension office to see if CIMIS ETo information is available.

For further information, call the CIMIS help line at 1-800-922-4647.



**Figure 5: CIMIS—Current & Historical Weather Station Sites**

<b>Sta #</b>	<b>Station Name</b>	<b>County</b>	<b>Start Date</b>	<b>End Date</b>	<b>Sta #</b>	<b>Station Name</b>	<b>County</b>	<b>Start Date</b>	<b>End Date</b>
1	Fresno/F.S.U. USDA	Fresno	06/07/82	09/25/88	79	Angwin	Napa	05/11/89	12/27/96
2	Five Points/USDA	Fresno	06/07/82	-----	80	Fresno State	Fresno	10/03/88	-----
3	Beach/Santa Cruz CO	Santa Cruz	05/30/82	08/25/86	81	Shenandoah Valley	Amador	05/11/90	-----
4	Webb/Santa Cruz CO	Santa Cruz	05/30/82	04/29/88	82	Claremont	Los Angeles	04/13/89	-----
5	Shafter/USDA	Kern	06/01/82	-----	83	Santa Rosa	Sonoma	02/11/89	-----
6	Davis	Yolo	07/17/82	-----	84	Browns Valley	Yuba	04/13/89	-----
7	Firebaugh/Telles	Fresno	09/22/82	-----	85	Hopland FS	Mendocino	09/23/89	-----
8	Gerber	Tehama	09/22/82	-----	86	Lindcove	Tulare	05/31/89	-----
9	Lamont	Kern	09/29/82	04/10/89	87	Meloland	Imperial	12/12/89	-----
10	Bakersfield/Greenlee	Kern	10/01/82	04/16/86	88	Cuyama	Santa Barbara	05/20/89	-----
11	Bakersfield/Bonanza	Kern	09/29/82	04/17/86	89	Salinas South	Monterey	09/05/92	-----
12	Durham	Butte	10/19/82	-----	90	Alturas	Modoc	04/23/89	-----
13	Camino	El Dorado	10/19/82	-----	91	Tulelake FS	Siskiyou	04/12/89	-----
14	Orland (inactive)	Glenn	10/30/82	04/21/87	92	Kesterson	Merced	10/13/89	-----
15	Stratford	Kings	10/29/82	-----	93	Lamont	Kern	02/04/90	10/03/94
16	San Juan	Monterey	10/23/82	08/24/95	94	Goleta Foothills	Santa Barbara	07/07/90	-----
17	El Centro	Imperial	11/08/82	05/27/87	95	Watsonville	Santa Cruz	09/13/89	07/24/95
18	Westmorland	Imperial	11/11/82	04/09/86	96	Woodside	Santa Mateo	10/31/90	01/24/94
19	Castroville	Monterey	11/18/82	-----	97	Port Hueneme	Ventura	02/16/91	-----
20	Corcoran	Kings	11/22/82	04/09/86	98	Ramona	San Diego	04/20/91	05/28/98
21	Kettleman	Kings	11/19/82	-----	99	Santa Monica	Los Angeles	12/11/92	-----
22	Caruthers	Kings	11/18/82	06/06/88	100	Fremont	Alameda	08/29/91	-----
23	King City	Monterey	11/19/82	12/23/85	101	Piru	Ventura	08/27/91	-----
24	Thermal (inactive)	Riverside	11/22/82	03/03/86	102	El Dorado	Los Angeles	10/24/90	10/20/99
25	Rancho Mirage	Riverside	11/22/82	11/20/85	103	Windsor	Sonoma	12/14/90	-----
26	Lost Hills	Kern	11/29/82	08/13/86	104	De Laveaga	Santa Cruz	09/28/90	-----
27	Zamora	Yolo	12/05/82	-----	105	Westlands	Fresno	04/17/92	-----
28	Soledad	Monterey	01/04/83	02/11/87	106	Sanel Valley	Mendocino	02/01/91	-----
29	Cantua Creek	Fresno	01/02/83	07/23/85	107	Santa Barbara	Santa Barbara	04/07/93	-----
30	Nicolaus	Sutter	01/03/83	-----	108	Gerber Dryland	Tehama	03/11/91	05/12/98
31	McFarland/Kern Farms	Kern	01/11/83	03/08/93	109	Carneros	Napa	03/11/93	-----
32	Colusa	Colusa	01/13/83	-----	110	Newberry Springs	San Bernardino	02/21/92	12/27/96
33	Visalia/ICI Americas	Tulare	01/05/83	-----	111	Green Valley Road	Santa Cruz	05/29/92	-----
34	Rancho California	Riverside	01/21/83	11/25/86	112	San Ardo	Monterey	06/18/93	03/13/95
35	Bishop	Inyo	02/04/83	-----	113	King City-Oasis Rd.	Monterey	06/12/93	-----
36	Blythe	Riverside	03/13/83	08/12/88	114	Arroyo Seco	Monterey	06/18/93	-----
37	Salinas	Monterey	04/11/83	07/27/92	115	Gonzales	Monterey	06/18/93	11/10/98
38	Santa Maria	Santa Barbara	05/03/83	04/27/99	116	Salinas North	Monterey	06/18/93	-----
39	Parlier	Fresno	05/23/83	-----	117	Victorville	San Bernardino	02/01/94	-----
40	Mendota/Murietta USDA	Fresno	06/14/83	04/15/92	118	Cathedral City	Riverside	12/07/95	-----
41	Calipatria/Mulberry	Imperial	07/17/83	-----	120	Guadalupe	Santa Barbara	12/24/93	-----
42	Lodi	San Joaquin	10/16/83	-----	121	Dixon	Solano	09/20/94	-----
43	Macarthur	Shasta	10/31/83	-----	122	Hastings Tract	Solano	03/28/95	-----
44	U.C. Riverside	Riverside	06/02/85	-----	123	Suisun Valley	Solano	08/18/94	-----
45	San Diego	San Diego	06/09/85	04/27/89	124	Panoche	Fresno	07/27/95	-----
46	MacDoel	Siskiyou	11/11/85	06/11/86	125	Arvin-Edison	Kern	03/22/95	-----
47	Brentwood	Contra Costa	11/18/85	-----	126	San Benito	San Benito	06/09/94	-----
48	Tulelake	Siskiyou	02/03/86	09/30/93	127	Salton Sea West	Imperial	11/21/94	-----
49	Oceanside	San Diego	03/11/86	-----	128	Salton Sea East	Imperial	11/17/94	-----
50	Thermal	Riverside	07/22/86	01/11/99	129	Pajaro	Monterey	09/13/95	-----
51	Healdsburg	Sonoma	08/24/86	03/28/94	130	Temecula East	Riverside	07/01/95	11/05/96
52	San Luis Obispo	San Luis Obispo	04/02/86	-----	131	Fair Oaks	Sacramento	04/18/97	-----
53	Greenfield	Monterey	10/10/86	10/23/91	132	Morgan Hill	Santa Clara	04/28/97	-----
54	Blackwells Corner	Kern	10/19/86	-----	133	Glendale	Los Angeles	08/07/96	-----
55	Palm Desert	Riverside	05/26/87	04/11/94	134	Barstow NE	San Bernardino	01/08/97	-----
56	Los Banos	Merced	06/28/88	-----	135	Blythe NE	Riverside	01/16/97	-----
57	Buntingville	Lassen	06/22/86	-----	136	Oasis	Riverside	01/07/97	-----
58	Santa Paula	Ventura	07/30/87	02/15/91	137	Temecula East II	Riverside	02/20/97	-----
59	Tehachapi	Kern	07/29/86	08/23/90	138	Famoso	Kern	04/09/97	-----
60	Barstow	San Bernardino	11/20/86	02/20/92	139	Winters	Solano	06/15/98	-----
61	Orland	Glenn	05/13/87	-----	140	Twitchell Island	Sacramento	10/08/97	-----
62	Temecula	Riverside	11/25/86	-----	141	Mecca	Riverside	05/05/98	-----
63	Novato	Marin	07/01/86	-----	142	Orange Cove	Fresno	01/01/99	-----
64	Santa Ynez	Santa Barbara	11/21/86	-----	143	San Juan Valley	San Benito	01/01/98	-----
65	Walnut Creek	Contra Costa	07/22/87	-----	145	Madera	Madera	05/13/98	-----
66	San Diego	San Diego	04/27/89	-----	146	Belridge	Kern	10/09/98	-----
67	Goleta	Santa Barbara	02/17/88	04/07/93	147	Olay Lake	San Diego	04/15/99	-----
68	Seeley	Imperial	05/29/87	-----	148	Merced	Merced	01/04/99	-----
69	San Jose	Santa Clara	06/08/87	-----	149	Oakland Foothills	Alameda	03/25/99	-----
70	Manteca	San Joaquin	11/12/87	-----	150	Miramar	San Diego	04/23/99	-----
71	Modesto	Stanislaus	06/25/87	-----	151	Ripley	Riverside	12/19/98	-----
72	Palo Verde	Imperial	09/08/87	-----	153	Escondido SPV	San Diego	02/01/99	-----
73	Hollywood Hills	Los Angeles	03/04/88	09/14/93	154	Salton Sea North	Riverside	10/15/98	-----
74	Escondido	San Diego	04/26/88	12/24/98	155	Bryte	Yolo	12/10/98	-----
75	Irvine	Orange	10/07/87	-----	159	Monrovia	Monrovia	10/15/99	-----
76	Belteravia	Santa Barbara	12/18/87	07/01/93	161	Patterson	Patterson	08/23/99	-----
77	Oakville	Napa	03/01/89	-----	162	Indio	Indio	12/24/99	-----
78	Pomona	Los Angeles	03/14/89	-----					

Figure 6: CIMIS Station Locations





# Further Information Sources

The following additional information sources can help those who have already established or are in the process of establishing a CIMIS-based irrigation system.

## Irrigation Scheduling Software

Many different computer programs are available to help growers and landscape managers schedule irrigations. The following is a list of available irrigation scheduling computer programs and their compatibilities. This is not in any way an endorsement by the California Department of Water Resources of these programs, nor is it meant to be a complete list of available irrigation scheduling software.

### **addVANTAGE**

Agricultural Irrigation & Soil  
Moisture Monitoring  
PC  
Adcon Telemetry  
3581 Westwind Boulevard  
Santa Rosa, California 95403  
(707) 522-2277  
[www.adcon.com](http://www.adcon.com)

### **AGWATER**

Examining On-Farm Water Management  
(Diagnostic Tool)  
PC  
Cal Poly Irrigation Training and Research Center  
San Luis Obispo, California 93407  
(805) 756-2434  
(805) 756-2433 Fax  
[www.itrc.org](http://www.itrc.org)

### **BIS2**

Irrigation Scheduling  
PC  
Richard Snyder  
Biometeorologist  
LAWR, Hoagland Hall  
UC Davis  
Davis, California 95616-8627  
(530) 752-4628  
(530) 752-1552 Fax

### **IREAD**

Interactive Irrigation  
Web  
Peek Electronics Inc.  
1316 Lymric Way  
Bakersfield, CA 93309  
(805) 833-3500  
(805) 398-8027  
[pept@kern.com](mailto:pept@kern.com)  
[www.theweatherpage.net](http://www.theweatherpage.net)

### **IRRICALC**

Irrigation Scheduling, Peak Demand  
Analysis, & Annual Water Use Estimating  
PC, Mac  
Software Republic  
17171 Park Row, Suite 325  
Houston, Texas 77084  
(800) 348-3243  
(281) 578-9440

### **Irrigation District Manager**

Water Delivery Scheduling for Irrigation  
Districts  
Advance Information Systems  
Post Office Box 95  
Sumpter, Oregon 97877-0095  
(541) 894-2465  
[www.advanceis.com](http://www.advanceis.com)

**Irrigation Evaluation****Irrigation System Evaluation**

PC

Cal Poly Irrigation Training and Research Center  
San Luis Obispo, California 93407

(805) 756-2434

(805) 756-2433 Fax

[www.itrc.org](http://www.itrc.org)

**JUDI****Downloading Software for CIMIS Data**

PC, HP150

Orange Enterprise, Inc.

2377 West Shaw, Suite 205

Fresno, California 93711

(209) 229-2195

(209) 229-9348 Fax

[www.orangesoftware.com](http://www.orangesoftware.com)

**Landscape Water Manager****Landscape Irrigation Scheduling**

PC

Cal Poly Irrigation Training and Research Center  
San Luis Obispo, California 93407

(805) 756-2434

(805) 756-2433 Fax

[www.itrc.org](http://www.itrc.org)

**PLANTMASTER****Landscape Irrigation**

PC, Mac

Acacia Software

2899 Agoura Road, Suite 652

West Lake Village, California 91361

(805) 499-9689

[www.plantmaster.com](http://www.plantmaster.com)

**ROY****Irrigation Scheduling**

PC, HP150

Orange Enterprise, Inc.

2377 West Shaw, Suite 205

Fresno, California 93711

(209) 229-2195

(209) 229-9348 Fax

[www.orangesoftware.com](http://www.orangesoftware.com)

**SAM****Soil Moisture Monitoring**

PC, HP150

Orange Enterprise, Inc.

2377 West Shaw, Suite 205

Fresno, California 93711

(209) 229-2195

(209) 229-9348 Fax

[www.orangesoftware.com](http://www.orangesoftware.com)

**WATERIGHT****Irrigation Scheduling Tutorial**

Web

Center for Irrigation Technology

California State University Fresno

Fresno, CA 93740

(209) 278-2066

[www.wateright.org](http://www.wateright.org)

## **Irrigation Consultants**

Many growers and landscape managers in California use irrigation consultants to help with irrigation scheduling. They are hired to conduct the required field work and analysis, and to advise on when to irrigate and how much water to apply. Consultants can also work with the grower or manager for a specified term to provide training on how to schedule irrigations using the consultants' computer programs (which must be purchased or leased from the consultant).

Listed on the following pages are consultants in California who offer services to growers in evaluating and scheduling water budget irrigations. This list is not in any way an endorsement by the California Department of Water Resources of these consultants, nor is it meant to be a complete list of consultants offering these services. Any consultant who offers water budget irrigation scheduling services can be added to this list by writing to Department of Water Resources, Water Use Efficiency Office, Post Office Box 942836, Sacramento, California 94236-0001.

### **Agricultural and Environmental Resource Assessment**

639 K Street  
Davis, California 95616  
(530) 758-8475

### **Agri-Valley Consulting Chris Morgner**

Post Office Box 3408  
Merced, California 95344  
(209) 722-7665  
(209) 722-4370 Fax  
CKJMorg@aol.com

### **Agro Industrial Management Irrigation & Soils Consultants Farouk A. Hassan, Ph.D**

Post Office Box 5632  
Fresno, California 93755  
(559) 224-1618  
(559) 299-9384 Fax

### **AGVISE**

#### **Jarald Davidson**

1770 Serenty Way  
Chico, California 95928-6943  
(916) 893-4520

### **Ag-Water Management**

#### **Andrew Hensel**

3635 E. Platt  
Fresno, California 93702  
(559) 268-9158  
(559) 268-9155 Fax

### **Anderson Associates International**

#### **Doug Anderson**

2130 Brandage Lane  
Bakersfield, California 93304  
(805) 633-5400

### **Applied Water Management Services**

#### **John A. Basanese**

1160 Arapaho Drive  
Gilroy, California 95020  
(408) 848-3649  
AWMSVS@aol.com

### **AquaMetrics**

#### **Gary Kah**

1114 Chesterton Ave.  
Redwood City, California 94061  
(650) 366-8076  
(650) 429-2010 Fax  
Gary\_Kah@AquaMetrics.com

### **Britz Fertilizers, Inc.**

#### **Timothy E. Smith**

Post Office Box 366  
Five Points, California 93624  
(209) 884-2421

### **California AgQuest**

#### **Ron Brase**

4323 N. Golden State, Suite 101  
Fresno, California 93722  
(559) 275-8095  
(559) 275-5301 Fax  
**RoneBrase@AgQuest.com**

**Cathcart/Begin Associated, Inc.**

**Harry Clarke**

44 Plaza Square  
Orange, California 92666  
(714) 771-6673

**Crop Care Associates, Inc.**

**Robert Gallagher**

Post Office Box 2419  
Yountville, California 94599  
(707) 944-2998  
(707) 275-6830 Fax

**Dellavalle Laboratory, Inc.**

1910 West McKinley, Suite 110  
Fresno, California 93728  
(559) 233-6129  
soillab@aol.com

**Dendron Landscape Management**

**Richard Reasoner**

Post Office Box 855  
Stinson Beach, California 94970  
(415) 868-0479

**Djegal Associates International**

**A. Djegal or Leona Djegal**

705 Mandarin Lane  
Walnut Creek, California 94598  
(925) 934-0880  
(925) 934-0880 Fax

**Don K. Burns Irrigation Consultants, Inc.**

1229 Roslyn Lane  
La Jolla, California 92037  
(619) 454-6433  
(619) 456-9785 Fax

**E. Domitz & Associates**

**Efraim Domitz**

Post Office Box 3247  
North Hollywood, California 91609  
(818) 362-0292  
(818) 362-9872 Fax

**Environmental Water Management**

**Chris Willig**

Post Office Box 1171  
Agoura Hills, California 91301  
(818) 889-6521  
(818) 707-1509  
ewaterm@aol.com

**The Earth Laboratory, Inc.**

**AquAudit Division, Landscape and Water Management**

3100 Airway Avenue, Suite 110  
Costa Mesa, California 92626-4604  
(714) 513-9225  
(714) 513-9230 Fax

**Gabrielsen & Associates**

**Byron C. Gabrielsen, Ph.D., CCA**

5921 W. Crowley Court  
Visalia, California 93291  
(559) 739-7442  
(559) 739-7442 Fax

**Gardeners' Guild, Inc.**

27 Larkspur Street  
San Rafael, California 94901  
(415) 457-0400

**Gary Motshagen, CID, CLIA, or**

**Gregory Motshagen, CLIA**

**G. L. Motshagen Associates, Ltd.**

711 West 17th Street, Suite G-9  
Costa Mesa, California 92627  
(714) 722-2967  
(714) 722-0567 Fax

**Gordon's Irrigation Consulting, a Corp.**

**Roger Gordon or Wes Hall**

23011 Moulton Parkway, Suite D-11  
Post Office Box 2008  
Laguna Hills, California 92653  
(714) 770-2910  
(714) 458-2393 Fax

**Greenmark Landscape Management**

**Marj J. Derhak**

74-940 Highway 111, Suite 105  
Indian Wells, California 92210-7111  
(888) 833-3710  
(888) 833-3710 Fax  
greenmrk@msn.com

**The Growing Concern**

Post Office Box 10391  
Fullerton, California 92635  
(714) 738-3623

**Hannesson & Associates**

**John Hannesson**

1301 Drake Drive  
Davis, California 95616  
(530) 756-4694

**Integrated Urban Forestry, Inc.****Mr. Tom Larson, President**

23441 South Pointe Dr., Suite 150  
Laguna Hills, California 92653  
(714) 837-5692  
(714) 837-5834

**Irrigation Consultant & Evaluation (ICE)****Mike Conner, CLIA**

1203 Champion Oaks Dr.  
Roseville, California 95661  
(916) 772-2226  
(916) 772-2226 Fax

**Irrigation Hawaii****Allan G. Schildknecht**

Post Office Box 549A  
Kaaawa, Hawaii 96730  
(808) 247-7777  
(808) 247-0118 Fax

**Irrigation Management Group (IMG)****John E. Blevens**

4 Union Square, Suite E  
Union City, California 94587  
(510) 471-2544  
(800) 421-2600  
(510) 471-6257 Fax

**Irrigation Water Management  
Group (IWM)****Rick Phenicie, CIA**

1451 S. Rimpau Ave., Suite 102-112  
Corona, California 91719  
(909) 777-0616  
(909) 491-6038 Fax

**JMLord**

267 North Fulton  
Fresno, California 93701  
(559) 268-9755

**Landscape Irrigation Consulting****Frank Simon**

2101 E. Coast Highway, Suite 215  
Post Office Box 368  
Corona Del Mar, California 92625  
(714) 759-7533  
(714) 759-7615 Fax

**Landscape Water Management****Chris Dundon**

716 Elsie Ave.  
San Leandro, California 94577  
(510) 614-9760

**LARC Associates****Landscape Irrigation Consultants**

31475 Lobo Canyon Road  
Agoura, California 91301  
(818) 706-1018

**Nakae & Associates, Inc.****Scott Kyle**

22693 Glenwood Drive  
Aliso Viejo, California 92656  
(949) 362-0405  
(949) 362-2585 Fax

**Pacific Agronomics, Inc.**

3435 West Shaw, #104  
Fresno, California 93711  
(559) 276-0401

**Pacific Green Landscape Architecture**

Gregg Polubinsky, MLA  
Post Office Box 344  
Watsonville, California 95077  
(408) 662-9412  
(408) 685-8353 Fax  
larch@pacificgreen.com

**Phytosphere Research**

Ted Swiecki, Ph.D.  
1027 Davis Street  
Vacaville, California 95687  
(707) 452-8735  
(707) 452-8735 Fax

**Pierre Charles Landscape Construction****Martine Charles**

Post Office Box 6778  
Laguna Niguel, California 92607  
(714) 489-9825  
(714) 489-9826 Fax

**Rain for Rent**

Highway 101, 3 Miles South  
Post Office Box 1968  
Salinas, California 93902  
(408) 422-7813



**Russell D. Mitchell & Associates, Inc.****Russell D. Mitchell**

2760 Camino Diablo  
Walnut Creek, California 94596  
(925) 939-3985

**Scaliter Irrigation Engineering, Inc.****Dan Scaliter**

902 Aaron Drive  
Redlands, California 92374  
(714) 794-5811  
(714) 794-5873 Fax

**Simplot Soilbuilders****Lora Pankey**

Post Office Box 198  
Lathrop, California 95330  
(209) 858-6464  
lpankey@simplot.com

**Stoddard & Associates****Hafiz Munir**

1120 West I Street, Suite C  
Los Banos, California 93635  
(209) 826-5155  
(209) 826-3307 Fax

**TurfTech Industries****Michael Wesner or Brian Barklage**

919 Manhattan Avenue, #F100  
Manhattan Beach, California 90266  
(310) 379-2701  
MAWesnerJr@aol.com

**Water and Landscape Consultants****Randall Ismay**

24002 Estacia Ave.  
Laguna Niguel, CA 92677-2213  
(714) 495-5819  
(714) 495-8534 Fax

**Water Management Group**

2200 Business Way, Suite 100  
Riverside, CA 92501  
(909) 788-8497  
(909) 788-8538 Fax

**Water Management Services****Raymond Sanders**

2422 N. French Street  
Santa Ana, CA 92706  
(714) 547-7481  
(714) 583-6801 Fax

**Water Wise Systems****Mike Schmitt**

2087-20 N. Lopez Canyon Road  
San Fernando, CA 91342  
(818) 897-9900

**Water Wise Systems****Doug Lape**

825 Mabury Road  
San Jose, CA 95133  
(408) 453-5904

**Water Wise Systems****Jay Gray**

1960 South Yale Street  
Santa Ana, CA 92704  
(714) 546-7843

**Xeris Technologies****John Curry**

445 Fenmore  
Barstow, California 92311  
(619) 252-8141

## **Public Agency Assistance**

### **Department of Water Resources CIMIS Personnel**

#### **DWR Sacramento Headquarters:**

Water Use Efficiency Office  
1020 Ninth Street, Third Floor  
Sacramento, California 95814

Baryohay Davidoff, Chief  
California Irrigation Management Unit  
CIMIS Project Manager  
(916) 327-1788  
(916) 327-1815 Fax  
baryohay@water.ca.gov

Simon Eching  
CIMIS Program Development and Outreach  
(916) 327-1836  
(916) 327-1815 Fax  
seching@water.ca.gov

David Moellenberndt  
CIMIS Weather Station Network and Data Quality Control  
(916) 327-1792  
(916) 327-1815 Fax  
davidm@water.ca.gov

#### **Northern Sacramento Valley Northeastern Stations:**

Eugene Pixley  
DWR Northern District  
2440 Main Street  
Red Bluff, California 96080-2398  
(916) 529-7392  
(916) 529-7322 Fax  
pixley@water.ca.gov

#### **Southern Sacramento Valley, Northern San Joaquin Valley and Bay Area Stations:**

Mark Rivera  
DWR Central District  
3251 S Street  
Sacramento, California 95816-7017  
(916) 227-7603  
(916) 227-7600 Fax  
mrivera @ water.ca.gov

#### **Central and Southern San Joaquin Valley and Monterey Bay Area Stations:**

Kent Frame  
DWR San Joaquin District  
3374 East Shields Avenue  
Fresno, California 93726  
(559) 230-3334  
(559) 230-3301 Fax  
kframe@water.ca.gov

**Southern Coast and Desert Areas:**

Sergio Fierro  
DWR Southern District  
770 Fairmont Avenue  
Glendale, California 91203-1035  
(818) 543-4652  
(818) 543-4604 Fax  
sergiof @ water.ca.gov

**CIMIS Help Line:**

1-800-922-4647

# Cooperative Extension County Offices

## Alameda

UCCE Alameda County  
1331 Harbor Bay Parkway, Suite 131  
Alameda, California 94502  
(510) 567-6812  
(510) 567-6813 Fax

West Oakland  
700 Adeline Street  
Oakland, California 94607

## Amador

108 Court Street  
Jackson, California 95642-2379  
Location:  
12380 Airport Road  
Martell, California 95654  
(209) 223-6482  
(209) 223-3279 Fax

## Butte

2279B Del Oro Avenue  
Oroville, California 95965  
(530) 538-7201  
(530) 538-7140 Fax

## Calaveras

891 Mountain Ranch Road, County Annex  
Government Center  
San Andreas, California 95249-9709  
(209) 754-6477  
(209) 754-6472 Fax

## Colusa

Post Office Box 180  
100 Sunrise Boulevard, Suite E  
Colusa, California 95932  
(530) 458-0577  
(530) 458-4625 Fax

## Contra Costa

75 Santa Barbara Road, Second Floor  
Pleasant Hill, California 94523-4488  
(925) 646-6540  
(925) 646-6708 Fax

## El Dorado

311 Fair Lane  
Placerville, California 95667-4195  
(530) 621-5502  
(530) 642-0803 Fax

## Fresno

1720 South Maple Avenue  
Fresno, California 93702  
(559) 456-7285  
(559) 456-7575 Fax

## Glenn

Post Office Box 697  
Road 200 E  
Orland, California 95963  
(916) 865-1107  
(916) 865-1105 Fax

## Humboldt-Del Norte

Ag Center Building  
5630 South Broadway  
Eureka, California 95503-6998  
(707) 445-7351  
(707) 444-9334 Fax

Del Norte Office  
Court House Annex  
981 H Street, Room 2  
Crescent City, California 95531  
(707) 464-4711  
(707) 464-7520 Fax

Hoopa Valley Indian Reservation  
Post Office Box 417  
(Fishers Dept)  
Hoopa, California 95546  
(916) 625-4268, Ext 7

## Imperial

1050 East Holton Road  
Holtville, California 92250-9615  
(760) 352-9474  
(760) 352-0846 Fax

## Inyo-Mono

207 West S Street  
Bishop, California 93514  
(760) 873-7854  
(760) 872-1610 Fax

## Kern

1031 South Mt. Vernon Avenue  
Bakersfield, California 93307  
(805) 868-6200  
(805) 868-6208 Fax

## Kings

680 North Campus Drive, Suite A  
Hanford, California 93230  
(559) 582-3211, ext. 2730  
(559) 582-5166 Fax

## Lake

Ag Center  
883 Lakeport Boulevard  
Lakeport, California 95453  
(707) 263-6838  
(707) 263-3963 Fax

**Lassen**

UCCE Lassen County  
707 Nevada Street  
Susanville, California 96130  
(916) 251-8132  
(916) 257-6129 Fax

**Los Angeles**

UCCE Los Angeles County  
2 Coral Circle  
Monterey Park, California 91755  
(213) 838-8330  
(213) 838-7449 Fax

Antelope Valley Office  
335A E Avenue K6  
Lancaster, California 93535  
(805) 723-4477  
(805) 723-3751 Fax

**Madera**

328 Madera Avenue  
(Location: SW Corner of Madera  
Avenue & Lewis Street)  
Madera, California 93637  
(559) 675-7879  
(559) 675-0639 Fax

**Marin**

1682 Novato Boulevard, Suite 150B  
Novato, California 94947-7021  
(415) 499-4204  
(415) 499-4209 Fax

**Mariposa**

5009 Fairgrounds Road  
(County Agricultural Commissioner's Office)  
Mariposa, California 95338-9435  
(209) 966-2417  
(209) 966-2056 Fax

**Mendocino**

Ag Center/Courthouse  
579 Low Gap Road  
Ukiah, California 95482  
(707) 463-4495  
(707) 463-4477 Fax

**Merced**

2145 West Wardrobe Avenue  
Merced, California 95340  
(209) 385-7403  
(209) 722-8856 Fax

**Modoc**

202 West 4th Street  
Alturas, California 96101  
(530) 233-6400  
(530) 233-3840 Fax

Intermountain Research  
& Extension Center  
Post Office Box 850  
Tulelake, California 96134  
(530) 667-2719  
(530) 667-5265 Fax

**Monterey**

1432 Abbott Avenue  
Salinas, California 93901  
(831) 759-7350  
(831) 758-3018 Fax

King City Office  
522 North 2nd Street  
King City, California 93930  
(831) 385-3618  
(831) 385-0551 Fax

**Napa**

1710 Soscol Avenue, Suite 4  
Napa, California 94559-1315  
(707) 253-4221  
(707) 253-4434 Fax

**Orange**

1045 Arlington Drive  
Costa Mesa, California 92626  
(714) 708-1606  
(714) 708-2754 Fax

**Placer-Nevada**

DeWitt Center  
11477 E Avenue  
Auburn, California 95603  
(530) 889-7385  
(530) 889-7397 Fax

Nevada County Office  
Veterans Memorial Building  
255 South Auburn Street  
Grass Valley, California 95945  
(530) 273-4563  
(530) 273-4769 Fax

**Plumas-Sierra**

208 Fairgrounds Road  
Quincy, California 95971  
(530) 283-6270  
(530) 283-4210 Fax

**Riverside**

21150 Box Springs Road  
Moreno Valley, California 92557-8718  
(909) 683-6491  
(909) 788-2615 Fax

Indio Office  
46209 Oasis Street, Room 118  
Indio, California 92201-5951  
(760) 863-8293  
(760) 775-0600 Fax

Palo Verde Office  
290 North Broadway  
Blythe, California 92225-1649  
(760) 921-7884  
(760) 921-2887 Fax

**Sacramento**

4145 Branch Center Road  
Sacramento, California 95827-3898  
(916) 875-6913  
(916) 875-6233 Fax

**San Benito**

649A San Benito Street  
Hollister, California 95023  
(831) 637-5346  
(831) 637-7111 Fax

**San Bernardino**

777 East Rialto Avenue  
San Bernardino, California 92415-0730  
(909) 387-2171  
(909) 387-3306 Fax

**San Diego**

5555 Overland Avenue, Building 4  
San Diego, California 92123-1219  
(619) 694-2845 (General)  
(619) 694-2860 (Master Gardener)  
(619) 694-2861 (4-H)  
(619) 694-2849 Fax  
(619) 571-4225 TDD

**San Joaquin**

420 South Wilson Way  
Stockton, California 95205-6299  
(209) 468-2085  
(209) 462-5181 Fax

**San Luis Obispo**

2156 Sierra Way, Suite C  
San Luis Obispo, California 93401  
(805) 781-5940

Paso Robles Office  
1734 Paso Robles Street  
Paso Robles, California 93446  
(805) 237-3100  
(805) 237-3088 Fax

**San Mateo-San Francisco**

San Mateo County Office  
625 Miramontes Street, Suite 200  
Half Moon Bay, California 94019-1945  
(650) 726-9059  
(650) 726-9267 Fax

San Francisco County Office  
300 Piedmont Avenue  
Building C, Room 305A  
San Bruno, California 94066-3959  
(650) 871-7559  
(650) 871-7399 Fax

Elkus Youth Ranch  
1500 Purisima Creek Road  
Mail to:  
625 Miramontes St., Suite 200  
Half Moon Bay, California 94019  
(650) 712-3158  
(650) 712-3158 Fax  
(650) 726-9059  
(650) 726-9267 Fax

**Santa Barbara**

Santa Maria Office  
Tech Service Building  
624 West Foster Road, Suite A  
Santa Maria, California 93455  
(805) 934-6240  
(805) 934-6333 Fax

UCCE Santa Barbara Office  
105 E. Anapamu Street, Suite 5  
Santa Barbara, California 93101  
(805) 568-3330

**Santa Clara**

1005 Timothy Dr.  
San Jose, California 95133  
(408) 299-2635  
(408) 298-5160 Fax

**Santa Cruz**

1432 Freedom Boulevard  
Watsonville, California 95076-2796  
(831) 763-8040  
(831) 763-8006 Fax

**Shasta-Trinity**

1851 Hartnell Ave.  
Redding, California 96002-2217  
(530) 224-4900  
(530) 224-4904 Fax

Shasta-Lassen Office  
Post Office Box 9  
Intermountain Fairgrounds  
First & Grove Street  
McArthur, California 96056-0009  
(530) 336-5784  
(530) 336-6845 Fax

Trinity Office  
Post Office Box 490  
Fairgrounds  
Hayfork, California 96041  
(530) 628-5495  
(530) 628-4171 Fax

#### **Siskiyou**

1655 South Main Street  
Yreka, California 96097  
(530) 842-6931  
(530) 842-2711 Fax

#### **Solano**

2000 West Texas Street  
Fairfield, California 94533-4498  
(707) 421-6790  
(707) 429-5532 Fax

#### **Sonoma**

2604 Ventura Avenue, Room 100-P  
(City Administration Center)  
Santa Rosa, California 95401-2894  
(707) 527-2621  
(707) 527-2623 Fax

#### **Stanislaus**

3800 Cornucopia Way, Suite A  
Modesto, California 95358  
(209) 525-6654  
(209) 525-4969 Fax

#### **Sutter-Yuba**

142A Garden Highway  
Yuba City, California 95991  
(530) 741-7515  
(530) 673-5368 Fax  
1-800-698-4544 TDD

#### **Tehama**

Post Office Box 370  
1754 Walnut Street  
Red Bluff, California 96080  
(916) 527-3101  
(916) 527-0917 Fax

#### **Tulare**

Ag Building, County Civic Center  
2500 W. Burrel Avenue  
(Corner of Woodland Drive and West Main)  
Visalia, California 93291-4584  
(559) 733-6363 (General)  
(559) 733-6456 (Expanded Food and  
Nutrition Education Program)  
(559) 733-6401 (4-H)  
(559) 733-6720 Fax

#### **Tuolumne**

2 South Green Street  
Sonora, California 95370  
(209) 533-5695  
(209) 532-8978 Fax

#### **Ventura**

669 County Square Drive, Suite 100  
Ventura, California 93003-5401  
(805) 645-1451 (General)  
(805) 645-1470 (4-H)  
(805) 645-1468 TDD  
(805) 645-1474 Fax

#### **Yolo**

70 Cottonwood Street  
Woodland, California 95695-2593  
(530) 666-8143  
(530) 666-8736 Fax

## **California Mobile Irrigation Laboratories**

Although CIMIS helps irrigators develop water budgets to determine when to irrigate and how much water to apply, in order to have an efficient irrigation schedule the grower or landscape manager must know the performance of the irrigation system. Mobile laboratories measure water application rates and system distribution uniformity and give recommendations for irrigation system improvement if necessary. Mobile laboratory services are provided by a variety of public agencies. Similar services are also provided by some consultants. Listed below are the mobile labs and team leaders in California.

### **Kern County**

Brian Hockett  
c/o Pond-Shafter-Wasco Resource Conservation District  
1601 New Stine Road, Suite 270  
Bakersfield, California 93309  
(805) 861-4129  
(805) 861-4333 Fax

### **Kings County**

John Weddington  
c/o Kings River Conservation District  
4886 East Jensen  
Fresno, California 93725  
(559) 237-5567  
(559) 237-5560 Fax

### **Riverside County**

Don Ackley  
c/o Coachella Valley Resource Conservation District  
80-975 Indio Boulevard, Suite B-11  
Indio, California 92201  
(760) 347-7658  
(760) 347-4967 Fax

Jim Gilmore  
c/o San Jacinto Basin Resource Conservation District  
711 W. Esplanade Avenue, Suite C  
San Jacinto, California 92383  
(909) 654-7733  
(909) 654-3157 Fax

Kerwin Russell  
c/o Riverside-Corona Resource Conservation District  
1299 Colombia Avenue, Suite E-5  
Riverside, California 92507  
(909) 683-7691  
(909) 683-3814 Fax  
rrcd@earthlink.net

### **San Diego County**

Connie Chai, Andrea Souther  
c/o Mission Resource Conservation District/Eco Lab  
1181 East Mission Road  
Fallbrook, California 92028  
(760) 728-1332  
(760) 728-1332 Fax  
missnrcd@tfb.com



**Santa Barbara County**

Robert Fastenau/Kevin Peterson  
Cachuma Resource Conservation District  
920 East Stowell  
Santa Maria, California 93454  
(805) 928-9269, Ext. 5  
(805) 928-9644 Fax  
robert.fastenau@ca.usda.gov  
kevin.peterson@ca.usda.gov

**Santa Clara County**

Bill and Dona Power  
c/o Hossein Ashktorab  
Santa Clara Valley Water District  
5750 Almaden Expressway  
San Jose, California 95118-3686  
(408) 265-2607, Ext. 2291  
(408) 265-2607 Fax  
hashktorab@scvwd.dst.ca.us

## **Publications**

### **Basic Irrigation Scheduling (Leaflet 21199)**

Cooperative Extension  
Agricultural Information and Publications  
University of California  
University Services Bldg., Room 110  
1441 Research Park Drive  
Davis, California 95616  
(530) 757-8930

### **CIMIS ETo Zone Map**

Water Use Efficiency Office  
1020 Ninth Street  
Sacramento, California 95814  
(916) 327-1675

### **CIMIS: Fifteen Years of Growth and a Promising Future**

CA Department of Water Resources  
Bulletins and Reports  
Post Office Box 942836  
Sacramento, California 94236-0001  
(916) 653-1097

### **Crop Water Use in California, Bulletin 113-4**

CA Department of Water Resources  
Bulletins and Reports  
Post Office Box 942836  
Sacramento, California 94236-0001  
(916) 653-1097

### **Determining Daily Reference Evapotranspiration (ETo), Rev. 1992 (Leaflet 21426)**

Cooperative Extension  
Agricultural Information and Publications  
University of California  
University Services Bldg., Room 110  
1441 Research Park Drive  
Davis, California 95616  
(530) 757-8930

### **Does Drip (and Other Low-Flow) Irrigation Save Water? 1984 (Leaflet 21380)**

Cooperative Extension  
Agricultural Information and Publications  
University of California  
University Services Bldg., Room 110  
1441 Research Park Drive  
Davis, California 95616  
(530) 757-8930

### **Drip Irrigation Management, 1981 (Leaflet 21259)**

Cooperative Extension  
Agricultural Information and Publications  
University of California  
University Services Bldg., Room 110  
1441 Research Park Drive  
Davis, California 95616  
(530) 757-8930

**Drought Irrigation Strategies for Deciduous Orchards, 1989 (Leaflet 21453)**

Cooperative Extension  
Agricultural Information and Publications  
University of California  
University Services Bldg., Room 110  
1441 Research Park Drive  
Davis, California 95616  
(530) 757-8930

**Drought tips: 92-09 Managing Irrigation in Fruit and Nut Trees During Drought**

CA Department of Water Resources  
Bulletins and Reports  
Post Office Box 942836  
Sacramento, California 94236-0001  
(916) 653-1097

**Drought tips: 92-16 Leaching**

CA Department of Water Resources  
Bulletins and Reports  
Post Office Box 942836  
Sacramento, California 94236-0001  
(916) 653-1097

**Drought tips: 92-20 Water Balance Irrigation Scheduling Using CIMIS ETo**

CA Department of Water Resources  
Bulletins and Reports  
Post Office Box 942836  
Sacramento, California 94236-0001  
(916) 653-1097

**Drought tips: 92-29 Irrigation Management Made Simple**

CA Department of Water Resources  
Bulletins and Reports  
Post Office Box 942836  
Sacramento, California 94236-0001  
(916) 653-1097

**Drought tips: 92-38 Field Use of Tensiometers**

CA Department of Water Resources  
Bulletins and Reports  
Post Office Box 942836  
Sacramento, California 94236-0001  
(916) 653-1097

**Drought tips: 92-45 Central Coast Crop Coefficients for Field and Vegetable Crops**

CA Department of Water Resources  
Bulletins and Reports  
Post Office Box 942836  
Sacramento, California 94236-0001  
(916) 653-1097

**Drought tips: 92-52 Irrigating Up Crops Efficiently With Sprinklers**

CA Department of Water Resources  
Bulletins and Reports  
Post Office Box 942836  
Sacramento, California 94236-0001  
(916) 653-1097

**Estimating Orchard Water Use with CIMIS**

Mission Resource Conservation District  
1181 East Mission Road  
Fallbrook, California 92028  
(760) 728-1332

**How Much Water has Your Crop Used Since Your Last Irrigation? Rev. 1994**

CA Department of Water Resources  
Bulletins and Reports  
Post Office Box 942836  
Sacramento, California 94236-0001  
(916) 653-1097

**Irrigation Scheduling: A Guide for Efficient On-farm Water Management. 1989  
(Leaflet 21454)**

Cooperative Extension  
Agricultural Information and Publications  
University of California  
University Services Bldg., Room 110  
1441 Research Park Drive  
Davis, California 95616  
(530) 757-8930

**Technical Elements of CIMIS**

Water Use Efficiency Office  
1020 Ninth Street  
Sacramento, California 95814  
(916) 327-1675

**The Water Budget Method - Irrigation Scheduling for Southern San Joaquin Valley  
Deciduous Orchards, 1986 (Leaflet 21419)**

Cooperative Extension  
Agricultural Information and Publications  
University of California  
University Services Bldg., Room 110  
1441 Research Park Drive  
Davis, California 95616  
(530) 757-8930

**Using Reference Evapotranspiration (ET<sub>o</sub>) and Crop Coefficients to Estimate Crop  
Evapotranspiration (ET<sub>c</sub>): (Agronomic Crops, Grasses, and Vegetable Crops. 1987)  
(Leaflet 21427)**

Cooperative Extension  
Agricultural Information and Publications  
University of California  
University Services Bldg., Room 110  
1441 Research Park Drive  
Davis, California 95616  
(530) 757-8930

**Using Reference Evapotranspiration (ET<sub>o</sub>) and Crop Coefficients to Estimate Crop  
Evapotranspiration (ET<sub>c</sub>): Trees and Vines. 1987 (Leaflet 21428)**

Cooperative Extension  
Agricultural Information and Publications  
University of California  
University Services Bldg., Room 110  
1441 Research Park Drive  
Davis, California 95616  
(530) 757-8930



# Training Information

Many public and private agencies offer either training classes, seminars, or workshops on different aspects of irrigation and irrigation scheduling. The Irrigation Training and Research Center at California Polytechnic State University, San Luis Obispo, and the Center for Irrigation Technology at California State University at Fresno are the two main institutions that offer this training on a regular basis. Also check with your county Cooperative Extension Office and Soil Conservation Office for workshops in your area. The addresses and telephone numbers of Cooperative Extension Offices are listed at the beginning of this section.

## AGWATER

This is an interactive learning/teaching computer program regarding agricultural irrigation. It combines irrigation scheduling and distribution uniformity concepts.

For information on class schedules and fees, contact the Irrigation Training and Research Center at Agricultural Engineering Department, Cal Poly State University, San Luis Obispo, California 93407; (805) 756-2434.

## Irrigation Evaluation Short Course

This two and one-half day short course is offered twice per year. It combines classroom (35 percent) and outdoor laboratory (65 percent) activities. The course is not mathematically oriented, and emphasizes philosophy and technique of evaluation, ranging from how to take a pressure measurement to what specific measurements are needed for evaluation of each distinct irrigation method (furrow, border strip, hand move/side roll sprinklers, linear move sprinkler, undertree sprinkler, and microirrigation). The techniques and program follow the standards used for DWR-funded evaluation projects throughout California.

For information on class schedules and fees, contact the Irrigation Training and Research Center at Agricultural Engineering Department, Cal Poly State University, San Luis Obispo, California 93407; (805) 756-2434.

## Designer/Manager School of Irrigation

The Designer/Manager School is a comprehensive educational program which offers a variety of classes designed for both agricultural and landscape irrigation professionals. The classes are designed so that participants receive practical information on key irrigation design management concepts. This allows them to prepare for the Irrigation Association Certification Exams and to receive PCA and CCA continuing education credits.

For information on class schedules and fees, contact the Irrigation Training and Research Center at Agricultural Engineering Department, Cal Poly State University, San Luis Obispo, California 93407; (805) 756-2434.

## Center for Irrigation Technology CSU, Fresno

CIT seminars and workshops serve as a forum for developing and demonstrating effective water management systems and practices. They are also used to disseminate information to

the public. These seminars and workshops cover basic irrigation scheduling, water auditing, system maintenance procedure, hands-on and computer-simulated irrigation systems, and other related topics. Theory is integrated with practice.

For information, contact CIT at California State University, Fresno, California 93740-0013; (559) 278-2066.

### **Bilingual Training Institute (BTI)**

BTI's mission is to improve water management practices, plant performance and proper use of irrigation equipment in both the landscape and agricultural industries, by educating field employee in both English and Spanish.

To accomplish this goal, BTI works in close cooperation with maintenance companies, growers, irrigation equipment and fertilizer manufacturers, government agencies and educators.

BTI irrigation system operation and maintenance classes include plant-soil-water relations, irrigation system adjustment and repairs, irrigation system troubleshooting, controller programming, practical techniques for irrigation scheduling, and basic hydraulics for system troubleshooting.

For more information, contact Toni Monzon, BTI, 1275 E. Walnut Ave., Orange, CA 92667; (714) 289-8815.

# Glossary of CIMIS Terms

## **Air Temperature**

Temperature of air surrounding a CIMIS weather station. It is measured at 1.5 meters above the grass-covered ground and in the shade.

## **Anemometer**

Instrument used to measure wind speed.

## **Applied Water Demand**

Amount of water needed to meet the demand of the user.

## **Atmospheric Pressure**

The pressure exerted by the weight of air above a given point.

## **Average (Value)**

The arithmetic mean of a set of values.

## **Celsius Temperature Scale (°C)**

A temperature scale on which the freezing point of water equals 0 degrees and the boiling point equals 100 degrees at standard atmospheric pressure (29.9 inches or 760 millimeters of mercury).

## **Crop Coefficient**

A conversion factor used to convert ETo (see Reference Evapotranspiration) to a particular crop evapotranspiration.

## **Dew Point (Temperature)**

The temperature to which air must be cooled (at constant pressure and constant water vapor content) for saturation to occur. When dew point is equal to air temperature, Relative Humidity equals 100 percent.

## **Distribution Uniformity**

The ratio of the average low-quarter depth of irrigation to the average depth of irrigation for the whole field, expressed as a percent.

## **ET**

See evapotranspiration.

## **ETo**

See "Reference Evapotranspiration (ETo)."

## **Evaporation**

The process by which a liquid changes into a gas.

## **Evapotranspiration**

The combined processes by which water is transferred from the soil surface and from a plant (from the leaf surface and through leaf pores) to the atmosphere (ambient air). Symbolized as ET.

## **Fahrenheit (°F)**

A temperature scale on which the freezing point of water equals 32 degrees and the boiling point equals 212 degrees at standard atmospheric pressure (29.9 inches or 760 millimeters of mercury).

## **Humidity**

A term that refers to water vapor content in the air.

## **Irrigation Efficiency**

The efficiency of water application and use, calculated by dividing a portion of applied water that is beneficially used by total applied water, expressed as a percentage.

## **Modem**

A device used to process a data signal in order that it can be transmitted over the telephone line. For example, data from the CIMIS computer is transmitted to CIMIS users' microcomputer via modem.

## **Net Radiation**

The difference in the amount of incoming radiation and the amount of radiation returning from the surface (also see "Solar Radiation").



**Precipitation**

All forms of water particles, liquid or solid, that fall from the atmosphere and reach the surface.

**Precipitation (Rain) Gauge**

Instrument used to measure the amount of precipitation. It is measured at one meter (39 inches) above the ground surface.

**Pyranometer**

Instrument used to measure solar radiation.

**Reference Evapotranspiration (ET<sub>o</sub>)**

The rate of evapotranspiration from tall, cool-season green-grass of uniform height (4 to 6 inches-10 to 15 cm-tall), completely shading the ground, and not short of water.

**Relative Humidity (RH)**

A measurement of the amount of moisture in the atmosphere. It is the ratio of actual Vapor Pressure to Saturation Vapor Pressure over a flat surface of water. Symbolized as RH.

**Resultant Wind**

The result of the mean wind speed and the mean wind direction over a given period.

**Saturation Vapor Pressure**

Pressure (force per unit area) exerted by water vapor in moist air if the air is "saturated" with respect to a flat surface of water.

**Sensor**

An instrument that measures meteorological variable (e.g., temperature) in the form of an electronic signal which is then converted to a digital value.

**Soil Temperature**

Temperature of the soil measured at a depth of 6 inches (15 centimeters) at CIMIS weather stations, under a grass-covered soil surface.

**Solar Radiation**

The heat, or energy, given out by the sun that is received on the earth surface.

**Station**

A group of sensors that measure and record meteorological data. Recorded data is either retrieved remotely or on site.

**Vapor Pressure**

The pressure (force per unit area) exerted by water vapor in moist air.

**Wind Direction**

The direction from which the wind is blowing.

**Wind Gust**

Refers to a peak wind speed.

**Wind Magnitude**

See "Resultant Wind."

**Wind Run**

The velocity of the wind measured in distance over time on a daily basis. Example: miles per day (mpd).

**Wind Speed**

The rate at which wind blows measured in distance over time. Example: miles per hour (mph).